

AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all previous listings and versions of claim in this application:

1. (Currently amended) A method of annealing a wafer, comprising:  
~~substantially evenly applying a substantially homogenous and even basic thermal budget to a weakened zone of a wafer substantially evenly over at least a portion of~~ the weakened zone, the basic thermal budget being insufficient to detach a detachment layer from a remainder of the wafer at the weakened zone; and  
applying an additional thermal budget locally in an initiation region of the weakened zone in which the basic thermal budget is applied for initiating detachment of the detachment layer at the weakened zone.
2. (Currently amended) The method of claim 1, wherein the weakened portion zone extends through a crystalline layer of the wafer.
3. (Original) The method of claim 2, wherein the wafer comprises a semiconductor material.
4. (Original) The method of claim 1, wherein a plurality of heating elements are operated to provide different amounts of heat to substantially evenly apply the basic thermal budget.
5. (Original) The method of claim 4, wherein the basic thermal budget is applied to the wafer in a substantially vertical orientation.
6. (Original) The method of claim 4, wherein the basic thermal budget is applied to the wafer in a substantially horizontal orientation.
7. (Original) The method of claim 1, wherein the basic thermal budget is applied before the application of the additional thermal budget.

8. (Original) The method of claim 1, wherein the basic and additional budgets are applied in a concurrent application.

9. (Original) The method of claim 8, wherein the wafer comprises a plurality of wafers to which the basic and additional thermal budgets are applied simultaneously.

10. (Original) The method of claim 1, further comprising flowing a heat conducting gas over the wafer and controlling the flow over a plurality of regions on the wafer for applying the even basic thermal budget.

11. (Original) The method of claim 10, wherein the flow of heat conducting gas is controlled by flowing the gas across a diffusion barrier damper to the wafer.

12. (Original) The method of claim 10, wherein the flow of heat conducting gas is controlled by flowing the gas across a perforated heating chamber damper to the wafer.

13. (Original) The method of claim 1, wherein the basic thermal budget is sufficiently high such that the application of the additional thermal budget causes the detachment to propagate through the weakened zone.

14-23. (Cancelled)

24. (Previously presented) The method of claim 1, wherein the thermal budgets are applied while the wafer is present in a wafer annealing device comprising a positioner configured for holding the wafer; and a heating assembly configured for applying the thermal budgets.

25. (Currently amended) The method of claim 24, wherein the heating device assembly comprises:

a plurality of heating elements disposed adjacent different portions of the wafer; and

a controller assembly operably associated with the heating elements for controlling the heating of different heating elements to produce different amounts of heat to substantially evenly apply the basic thermal budget.

26. (Previously presented) The method of claim 25, wherein the controller assembly is operably associated with the heating elements for independently controlling the different heating elements.

27. (Previously presented) The method of claim 25, wherein the heating assembly comprises:

a gas feed for flowing a heat conducting gas for transferring heat to the wafer;  
and

a gas control assembly configured for controlling the distribution of the gas flow in association with the wafer.

28. (Previously presented) The method of claim 27, wherein the gas control assembly comprises a diffusion damper configured to cause the gas to flow in a predetermined configuration.

29. (Previously presented) The method of claim 28, wherein the diffusion damper comprises a perforated heating chamber in which the wafer is received for heating or a diffusion barrier.

30. (Previously presented) The method of claim 25, wherein the heating elements extend generally horizontally and are stacked in a generally vertical direction.

31. (Previously presented) The method of claim 30, wherein the positioner is configured for holding the wafer substantially vertically for heating.

32. (Previously presented) The method of claim 30, wherein the heating elements substantially surround the wafer held by the positioner.

33. (Previously presented) The method of claim 24, wherein the positioner is configured for holding the wafer substantially horizontally for heating.

34. (New) The method of claim 1, wherein the basic and additional thermal budgets are applied to provide a substantially homogenous roughness on the detached detachment layer.

35. (New) The method of claim 34, wherein the homogenous roughness is substantially free of a vertical gradient of roughness.

36. (New) The method of claim 1, wherein the additional thermal budget is applied to provide a hot point within the weakened zone to initiate the detachment through the remainder of the region of weakness that has only the basic thermal budget.

37. (New) The method of claim 1, wherein the basic thermal budget is substantially even over at least 2/3 of the weakened zone.

38. (New) The method of claim 1, wherein the basic thermal budget is substantially even over at least 3/4 of the weakened zone.

39. (New) The method of claim 1, wherein the basic thermal budget is substantially even over at least 90% of the weakened zone.

40. (New) The method of claim 1, wherein the basic thermal budget is substantially even over substantially the entire weakened zone.